# RESEARCH PROTECTIONS UPDATE

News and Comments on the Protection of Human Subjects in Navy and Marine Corps Research

*Volume 10 Number 1* *March 2020*

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**Spotlight**

## A Hot Topic for Cold Weather Warfighter Operational Effectiveness at the International Congress on Soldiers' Physical Performance

*Naval Health Research Center's Warfighter Performance Research Physiologists Present Latest Evaluations of Physiological and Neurocognitive Responses to Cold Water Immersion and Rewarming*

The International Congress on Soldiers' Physical Performance (ICSPP) is held once every three years and attracts scientists, practitioners, and military leaders from all over the world. This sentinel meeting is known for exceptional content regarding applied, operationally relevant military human performance research. The theme for ICSPP 2020 was "Optimizing the Winter Soldier" and was held February 11–14 in Quebec City, Canada.

Modern conflicts have taken our armed forces around the globe and placed them in diverse climates ranging from oppressive heat and humidity to freezing temperatures. Mr. Jay Heaney, Thermal Physiologist and Deputy Director of the Naval Health Research Center's (NHRC) Warfighter Performance Department, presented his team's work assessing the physical and neurocognitive responses to cold water immersion and rewarming. These findings, which are the culmination of data collected over a five year period, directly inform practice and policy for military operations in the austere environment. The Thermal Physiology Team in NHRC's Warfighter Performance Department seeks to broaden the understanding of the physiological effects of harsh environmental temperatures. The goal is to develop

Testing physical and neurocognitive responses to cold water immersion and rewarming— *Photo courtesy of NHRC Public Affairs.*

*(continued on page 3)*

# *Naval Medical Research Center (NMRC) History Panel 1*

This is part of a series of historical Navy medical R&D panels prepared by Mr. André B. Sobocinski, BUMED Historian. The mission of the BUMED History Office is to promote, preserve, and document the history and heritage of the Navy Medical Department, past and present. This mission is accomplished through management of the Navy's commemoration/ historical outreach program, oral history program, command operations report program, reference desk, publication program and archives/ historical collection.

## Naval Medical Research Center (NMRC)

*Established on 27 October 1942*

## PRE-HISTORY

### NAVAL MEDICAL SCHOOL: A SCIENTIFIC ARMORY

The end of the Spanish American War marked the emergence of the United States as a global military power and the beginning of the Navy's long history in global health engagement. At the start of the twentieth century, the U.S. Navy expanded into Samoa (1900), Cuba (1903), Guam (1898), the Philippines (1905), Puerto Rico (1902), Territory of Hawaii (1898) and the Panama Canal Zone (1903); with these new ports came a host of endemic tropical illnesses with debilitating effects on military personnel. The Navy's chief weapon in this fight was science; and in the early twentieth century, its scientific armory was the Naval Medical School.

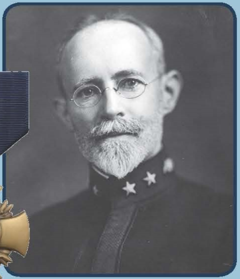
ESTABLISHED IN MAY 1902

**OLD NAVAL OBSERVATORY, WASH., D.C.**

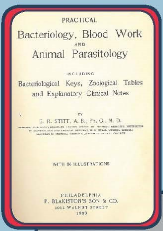
HOME OF THE NAVAL MEDICAL SCHOOL 1902 TO 1942

### SUBMARINE RESEARCH, 1910s

In 1911, Passed Assistant Surgeon I.F. Cohn, USN, outlined the harmful effects of gasoline fumes, the risk of carbon monoxide poisoning, temperature control and "depressing influences" in submerged environments. In 1916, Passed Assistant Surgeon R.W. McDowell wrote that "special care" was needed to be taken in selecting personnel for submarine duty and specifically their "temperamental qualifications" and psychological readiness. These early investigations helped frame the field of undersea medical research for future generations.



### REAR ADM. EDWARD STITT (1867-1948) NAVAL MEDICAL SCHOOL SUPERINTENDENT AND RESEARCHER



PRACTICAL
Bacteriology, Blood Work
AND
Animal Parasitology
INCLUDING
Bacteriological Keys, Zoological Tables
and Explanatory Clinical Notes
BY
E. R. STITT, A. B., Ph. G., M. D.

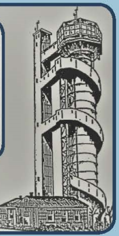
WITH 86 ILLUSTRATIONS

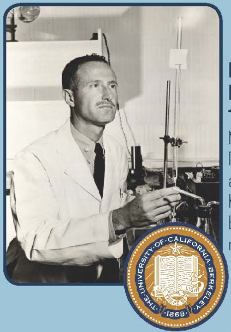
PHILADELPHIA
P. BLAKISTON'S SON & CO.
1012 WALNUT STREET
1909

In 1920, Rear Adm. Edward Rhodes Stitt was awarded the Navy Cross for his role in the fields of medical research, education and sanitation at the Naval Medical School. Among his greatest legacies were two textbooks Practical Bacteriology, Blood Work and Animal Parasitology (1909) and The Diagnostics and Treatment of Tropical Diseases (1914). Inspired by his own teachings and travels, these books offered readers an intimate and comprehensive knowledge of disease epidemiology, prophylaxis and laboratory science.

### DR. BEHNKE'S RESEARCH ON AIR EMBOLISM, APRIL 1932

LT (j.g.) Al Behnke, MC, USN, publishes a letter in the Naval Medical Bulletin outlining the causes of lethal arterial gas embolisms in submarine escape training.





### DR.KRUEGER ESTABLISHES MEDICAL LAB AT UC BERKELEY, 1 OCTOBER 1934

Naval Reserve Laboratory Research Unit No. 1, is established at UC Berkeley by LCDR Albert Krueger, MC, USNR, a noted bacteriologist and expert on respiratory diseases.

### TETANUS TOXOID STUDY, 1934

The U.S. Navy pioneered the largest experimental tetanus toxoid study ever conducted on a control population. Led by researcher CAPT W.W. Hall, MC, USN, and taking place aboard the hospital ship USS Relief (AH-1), the Navy study looked at the proper intervals between injections as well as the required number of injections for successful immunization with an alum-precipitated toxoid.

### AVIATION RESEARCH, NOVEMBER 1939

The Naval Medical School of Aviation Medicine in Pensacola, Fla., established a research section under CDR John Poppen, MC, USN. Decades later the research section will become a seperate command alled the Naval Aerospace Medical Research Laboratory (NAMRL).

### HELIOX AND THE SQUALUS RESCUE, 1939

In the months before the rescue of the crew of the submarine USS Squalus. LT Al Behnke conducts experiments in a pressure tank to determine the value of helium-oxygen mixtures in deep-sea diving. Behnke found that the oxygen-helium mixture reduced the risk of nitrogen narcosis symptoms while breathing under pressure. The Squalus rescue allowed for Behnke's helium experiments to be utilized in a real-world situation in dives below 150 feet. It also opened doors for new research in submarine medicine.

# A Hot Topic for Cold Weather Warfighter

*(Continued from page 1)*

evidence-based solutions to manage heat and cold stress while protecting warfighter health and maximizing performance.

"The team presented several talks on the impact of exposure to cold water and cold air temperature on cognitive performance. As military operations transition to frigid environments, NHRC is investigating both cognitive and physical performance issues. One innovative approach being used in these investigations is mobile electroencephalography (EEG) while performing cognitive tasks. Thus far, this technique has provided unique insights to neurocognitive elements of human performance in cold environments, with delays in cognitive response observed when body temperature decreases," explains Mr. Heaney. Exposure to environmental stressors, such as freezing cold water can cause physiological and cognitive deterioration leading to decreased performance. For the warfighter, this reduces capabilities and effectiveness, which can then lead to compromised missions. At the Marine Corps Mountain Warfare Training Center in Bridgeport, California, training is conducted to prepare both warfighters and the medical personnel who care for them to operate in cold environments. During the three week course, students are taught the deleterious effects of accidental hypothermia as part of their training. Students are taught best practices on how to quickly and effectively rewarm following a ten minute ice water immersion exercise, which facilitates return to operational tasks.

While it is well known that many warfighters exhibit functional limitations resulting from exposure to cold environments, the specific reasons for such impairments are not well delineated. To better understand the underlying causes, NHRC's Warfighter Performance team used EEG hardware and other signal processing techniques to assess participants while in the frigid water. Cognitive results paired with EEG recordings provided valuable information on warfighter's neurocognitive responses during cold water immersion and rewarming.

INTERNATIONAL CONGRESS ON SOLDIERS' PHYSICAL PERFORMANCE

Dr. Doug Jones presents at the International Congress on Soldiers' Physical Performance (ICSPP) in Quebec City, Canada—*Photo courtesy of NHRC Public Affairs.*

One of the lead scientists of the Thermal Physiology Team, Dr. Doug Jones, not only manages the study but invests his work on a personal level. During his time away from the lab, he spends his weekends in the winter volunteering as an alpine ski patroller for the Snow Valley Mountain Patrol, where he has seen firsthand, the effects of hypothermia. "This work has allowed me to blend my passion for the mountains and cold environments with ground-breaking research to identify specific performance impairments that warfighters are encountering in cold operational settings," comments Dr. Jones.

At this time, NHRC's Warfighter Performance Department is the only research group that has been able to collect high quality EEG data in the field during cold environmental conditions.

NHRC's mission is to optimize the operational readiness and health of our armed forces and families by conducting research, development, testing and evaluation informing Department of Defense (DoD) policy. NHRC supports military mission readiness with research and development that delivers high-value, high-impact solutions to the health and readiness challenges our military population faces on the battlefield, at sea, on foreign shores, and at home. NHRC's team of distinguished scientists and researchers consists of active duty service members, federal civil service employees and contractors, whose expertise includes physiology, microbiology, psychology, epidemiology, and biomedical engineering.

**See supporting video of story, follow link below**
https://youtu.be/C9ZdesGoNnc

*Content courtesy of NHRC Public Affairs.*

At the 2019 Public Responsibility in Medicine & Research (PRIM&R) Advancing Ethical Research (AER) Conference in Boston, MA, photographed from left to right top row: CDR John Melton (Director, DON HRPP), and Dr. Laura Brosch (USUHS). Middle row from left to right; Ms. Amber Gunn-Westland (DON HRPP), Ms. Chidi Ioanou (DON HRPP), and Ms. Kathleen Osei (DON HRPP). Bottom row from left to right: Dr. Carolina Guevara (NAMRU-6), Ms. Rochelle Collantes (DON HRPP), Ms. Nora Livengood (DON HRPP), Ms. Cindy Mazowieski (DON HRPP), Mr. Derek Englis (DON HRPP), Ms. Roxana Lescano (NAMRU-6), Ms. Zoe Moran (NAMRU-6), Ms. Sophea Sout (NAMRU-2), Ms. Satharath Pachada (NAMRU-2), and Dr. Meng Sokchea (NAMRU-2).

## DON HRPP News!!

- Washington Headquarters Services (WHS) conducted information sessions on surveys and information collections on 14 January and 6 February 2020. During the town halls, presenters discussed coordination and submission requirements for reviews of multi-Component conducted surveys and DoD-sponsored surveys of the public. For questions, please contact Mr. Mike DiNicolantonio of Office of People Analytics (OPA) at michael.t.dinicolantonio.civ@mail.mil or Ms. Angela James of WHS at angela.n.james4.civ@mail.mil.

- SAVE THE DATE! Please mark your calendars for DoD Research Days on September 15 &16 . More details to follow.

**We Need Your Help!**

**Get a BZ from RPU**

Have a "Good News" story or picture from your Research Protection Program? Don't keep it to yourself! Why not share it with the DON Research Protection community? We're looking for material to publish in the *Research Protections Update* newsletter. Send your research news, success stories, tips, pictures, lessons learned, or other material related to the ethical conduct of human research to

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